

Claims:

1. A method of determining a near neighbor to a target point in multidimensional space from among a set of candidate points, comprising:

generating a matrix of bins;

5 identifying a first bin that contains the target point;

locating a first candidate point in the first bin;

searching at least a second bin adjacent to the first bin for a second candidate point;

and

10 calculating the distances between each of the first and second candidate points and the target point.

2. The method of claim 1 wherein the matrix of bins encompasses the target point and the candidate points.

15 3. The method of claim 1 wherein generating the matrix of bins includes, for each dimension, establishing a maximum and minimum bin limits to closely encompass the points.

20 4. The method of claim 1 including calculating the distance between the first candidate point and the target point prior to searching the second bin, and including determining which bin to search based on the distance between the first candidate point and the target point.

25 5. The method of claim 4 wherein searching at least a second bin adjacent to the first bin for a second candidate point includes searching all bins that include portions closer to the target point than the first candidate point.

30 6. The method of claim 1 wherein searching at least a second bin adjacent to the first bin for a second candidate point includes searching all bins that include portions potentially closer to a first selected point in the first bin than a second selected point in the first bin.

7. The method of claim 1 wherein searching at least a second bin adjacent to the first bin for a second candidate point includes searching all bins that include portions.

8. A method of determining a near neighbor to a target point in multidimensional space from among a set of candidate points, comprising:

generating a matrix of bins;

identifying a first bin that contains the target point;

5 searching the first bin for a first candidate point; and

identifying a set of proximate bins selected from the matrix, each of the proximate bins having at least a portion potentially closer to a first selected point in the first bin than is a second selected point in the first bin.

10 9. The method of claim 8 including searching the first bin for all candidate points and determining which of the candidate points in the first bin is closest to the target point.

10. The method of claim 9 wherein identifying the set of proximate bins includes selecting all bins having a portion separated from any portion of the first bin by a distance
15 less than the distance between two maximally separated point in opposed corners of the first bin.

11. The method of claim 8 wherein the matrix of bins encompasses the target point and the candidate points.

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12. The method of claim 8 wherein generating the matrix of bins includes, for each dimension, establishing a maximum and minimum bin limits to closely encompass the points.

25 13. The method of claim 8 including identifying the location of the target point within the bin, and determining which proximate bins to search based on the location.

14. The method of claim 8 including searching each of the selected bins for candidate points, and calculating a distance from each located candidate point and the first candidate
30 point to the target point, such that the nearest candidate point is determined.

15. The method of claim 8 including calculating the distance between the first candidate point and the target point prior to searching any of the proximate bins, and wherein identifying a set of proximate bins based on the distance between the first candidate point
35 and the target point.

16. A comparison system comprising:

a target point;

a plurality of candidate points; and

an analysis module executing on a processor wherein the analysis module is configured to generate a matrix of bins, to identify a first bin that contains the target point, to search the first bin for a first candidate point, and to identify a set of proximate bins selected from the matrix, each of the proximate bins having at least a portion potentially closer to the target point a first selected point in the first bin than a second selected point in the first bin.

17. The system of claim 16 wherein the module is configured to select all bins having a portion separated from any portion of the first bin by a distance less than the distance between two maximally separated point in opposed corners of the first bin.

18. The system of claim 16 wherein the module is configured to identify the location of the target point within the bin, and determining which proximate bins to search based on the location.

19. The system of claim 16 wherein the module is configured to search each of the selected bins for candidate points, and calculating a distance from each located candidate point and the first candidate point to the target point, such that the nearest candidate point is determined.

20. The system of claim 16 wherein the module is configured to calculate the distance between the first candidate point and the target point prior to searching any of the proximate bins, and wherein identifying a set of proximate bins based on the distance between the first candidate point and the target point.